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The Problem of the Pilot's Professional Health Restoration

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When analyzing the dynamics of the Russian Airforce air crew's functional condition, working capacity and professional reliability in the process of their flight activity and the results of clinical and physiological examinations, we witness a distinct tendency for deterioration of air crew's level of professional health owing to a complex of psycho-physiological, social, organizational, ecological and demographic factors.

Practice and research activities confirm the necessity of having means and methods available to rehabilitate the pilot's functional status in the process of his professional activity, including psychological, electro-physiological, pharmacological and other types of treatment.

The main tasks when rehabilitating the pilot's functional status in pre-flight or in post-flight situations include:

- enduring and stable maintenance of operational working capacity;
- mobilization of psycho-physiological functions to perform the most crucial stages of work;
- treatment of acute forms of neuro-emotional reactions;
- treatment of monotony, hypodynamics and tiredness (exhaustion);
- rapid restoration of functional status after physical and mental overload;
- regulating the level of neuropsychic and motivational activity, creating a favorable emotional and sensory background;
- optimization of adaptive reactions of the organism to shifts in environmental factors and in working conditions;
- formation and maintenance of professionally significant aspects of psychosomatic functioning of air crew.

Such a variety of tasks necessitates the development and utilization of a wide complex of means and methods for rehabilitating the pilot's functional condition, and these should be able to have an effect on different functional systems of the organism. The specific choice of means and methods depends on the specific nature of the air crew's functional disorder, and the work schedule as well as the personality of each pilot should be taken into consideration. The ultimate aim of the treatment is to maintain proper levels of efficiency by mobilizing the protective and compensatory abilities of the organism. Hence, rehabilitation of the pilot's functional status serves to maintain the pilot's professional health.

In our opinion, the problem of restoring the pilot's functional status in the field of aviation medicine should be considered within the wider context of functional status control of healthy individuals during their professional activities. The essence of this approach includes the assessment, monitoring and evaluation of the psycho-physiological reserve level of the pilot's organism. It also implies a purposeful use of adequate means and methods to mobilize compensatory and adaptive mechanisms, which regulate the primary physiological and mental functions which subserve the pilot's professional health, and to ensure a proper level of the pilot's working capacity and his professional reliability.

Rehabilitation medicine serves to optimize the individual's professional health level, which is affected by a complex of physiological, hygienic, occupational and social factors. This can be achieved by means of psycho-physiological reserve diagnostics during on-line medical inspections and thorough medical examinations as well as by a complex of methods to treat functional disorders. This can be performed at a military unit level or at a specialized rehabilitation center, sanatorium or hospital.

The main rehabilitation measures include:

- treatment of pathogenetic mechanisms of functional disorders;
- diagnostic and rehabilitative measures which take into account the professional, social, physiological and psychological spheres of the pilot's life and activities;
- influencing the pilot's personality and his primary mental and physiological systems;
- a succession of treatment phases: step by step expansion of their effects and complexity, alternation and supplementation of methods at prophylactic, correction and restoration periods etc.

The principal means and methods for the psycho-physiological status control of pilots are:

Means and methods to influence the pilot's psycho-physiological status during long flights:

- * psychosomatic self-management;
- * electro-stimulation of muscles;
- * self-massage of bioactive points;
- * physical exercises;
- * audio-visual aids.

Rapid correction methods of the pilot's performance capacity:

- * psychosomatic self-management;
- * rational psychotherapy;
- * music therapy;
- * central nervous system (CNS) electro-tranquilization;
- * sauna;
- * hydrotherapy;
- * manual therapy;

- * recreational therapy (active rest);
- * hearing function stimulation;
- * hyperbaric oxygenation;
- * climatotherapy;
- * physical exercise.

Methods of increasing body functional resistance to flight and navigation conditions:

- * electro-stimulation of muscles;
- * CNS electro-tranquilization;
- * neuropeptides;
- * thermal adaptation regimes;
- * adaptogenes, mobilizing and energy saving stimulants;
- * aminoacid and vitamine complex;
- * bionormalizer biocorrector;
- * physical exercise, etc.

THE AREAS OF THE APPLIED METHODS

- * Long Distance Aviation;
- * Military Transport Aviation;
- * Navy Aviation;
- * Military units;
- * Recreation and Rehabilitation Center;
- * Specialized Treatment Center;
- * Sanatorium.

THE RESULTS OF THE APPLIED METHODS

- * Maintenance of crew members' performance capacity, prevention of fatigue (exhaustion), increase of the pilot's performance capacity during long flights;
- * Reduction of the recovery period, increase of the organism reserve capacities, improvement of quality of working activity;
- * Increase of thermal and vestibular stability (resistance) of Navy Aviation air crew.

The realization of the principal regulations of the Rehabilitation Medicine requires that the research and diagnostic centers are transferred to the military unit level, which will make it possible to monitor the

functional status and the reserves of the organism directly in the combat training process, and to diagnose primary function disorders of separate systems at early stages. This approach will allow a redirection of the medical monitoring from somatic diagnosis and disease verification to a quantitative assessment of the health level and its reserves. On this basis, timely treatment of unfavorable changes and negative effects of professional environment is possible.

The complex system of professional health restoration introduced in the medical support practice includes a differentiated application of adequate psycho-physiological methods, directed at pathological processes, as well as a normalization of the regulatory, power-saving and resistant functions of the organism. It may increase the professional and physical working capacity levels by 20-30%, it may prevent atherosclerosis and cardiovascular diseases (by 1.5 –1.7 times) and it may help to reduce disabilities (by 1.6 –1.9 times). On the whole, this approach results in increasing levels of functional reliability and professional health of air crews.

Despite some positive results, however, the problems in rehabilitative medicine in aviation are far from being resolved. Many questions concerning theory, applied research, organization and staffing still remain unanswered. In our opinion, the most important issues for further study are:

- development of research on the control of the pilot's psycho-physiological status during his professional activity;
- identification of diagnostic methods, estimation and correction of the pilot's psycho-physiological status and his working capacity;
- development of airborne equipment and programs for monitoring the pilot's psycho-physiological status in flight;
- development of a computer-based pre-nosological expert system for diagnostics and correction of the individual's professional health;
- creation of a system for the diagnostic, health improving and restoration measures for technical staff / engineering personnel;
- preparing of printed materials (programs, manuals, lectures), video films for training and postgraduate training of flight surgeons.

Of course, there are various serious problems involved in the improvement of the logistics needed for the implementation of the rehabilitative medicine system on the level of military units, and in the building of specialized rehabilitation centers. The organizational changes which are presently taking place in the Russian Army and Air Force may create the necessary prerequisites to successful solution of the problems of air crew's professional health restoration.